



PATENT

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Applicant: Marie A. Guion; Arthur G. Erdman; Confirmation No. 1949  
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Tewfik; Craig D. Oster

Serial No.: 10/781,118

Filed: February 18, 2004 Customer No.: 28863

Examiner: Unknown

Group Art Unit: 3736

Docket No.: 1004-085US01

Title: ANALYSIS OF AUSCULTATORY SOUNDS USING SINGLE VALUE  
DECOMPOSITION

CERTIFICATE UNDER 37 CFR 1.8: I hereby certify that this correspondence is being deposited with the United States Post Service, as First Class Mail, in an envelope addressed to: Commissioner for Patents, Alexandria, VA 22313-1450 on

June 1, 2006

By:

*Connie M. Scheff*  
Name: Connie Scheff

**SUPPLEMENTAL INFORMATION DISCLOSURE STATEMENT**

Mail Stop Amendments  
Commissioner for Patents  
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Dear Sir:

Applicant submits the references listed on the attached form PTO-1449. This statement is being filed, to the best of Applicant's knowledge, before the receipt of a first Office Action on the merits.

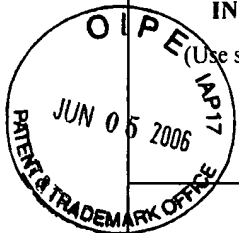
Applicant has enclosed a copy of each article cited and each foreign document cited. Copies of the U.S. patents are not enclosed as this requirement has been waived by the U.S. Patent Office.

Respectfully submitted,

Date: June 1, 2006  
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<b>Form 1449*</b>  <b>INFORMATION DISCLOSURE STATEMENT</b>  <b>IN AN APPLICATION</b> (Use several sheets if necessary)	Docket Number: 1004-085US01		Application Number: 10/781,118	
	Applicant: Marie A. Guion; Arthur G. Erdman; George Sommerfeld; Ahmed H. Tewfik; Craig D. Oster			
	Filing Date: February 18, 2004		Group Art Unit: 3736	
	Examiner Name: Unknown			



## U.S. PATENT DOCUMENTS

Examiner Initial	Document Number	Issue/Document Publication Date	Name	Filing Date If Appropriate
	3,878,832	04/22/1975	Tickner et al.	
	4,094,308	06/13/1978	Cormier	
	4,154,231	05/15/1979	Russell	
	4,193,393	03/18/1980	Schlager	
	4,220,160	09/02/1980	Kimball et al.	
	4,289,141	09/15/1981	Cormier	
	4,446,873	05/08/1984	Groch et al.	
	4,546,777	10/15/1985	Groch et al.	
	4,548,204	10/22/1985	Groch et al.	
	4,549,551	10/29/1985	Dyck et al.	
	4,549,552	10/29/1985	Groch et al.	
	4,672,976	06/16/1987	Kroll	
	4,679,570	07/14/1987	Lund et al.	
	4,712,565	12/15/1987	Katz et al.	
	4,720,866	01/19/1988	Elias et al.	
	4,792,145	12/20/1988	Eisenberg et al.	
	4,889,130	12/26/1989	Lee	
	4,967,760	11/06/1990	Bennett, Jr., et al.	
	5,025,809	06/25/1991	Johnson et al.	
	5,109,863	05/05/1992	Semmlow et al.	
	5,213,108	05/25/1993	Bredesen et al.	
	5,218,969	06/15/1993	Bredesen et al.	
	5,301,679	04/12/1994	Taylor	
	5,360,005	11/01/1994	Wilk	
	5,687,738	11/18/1997	Shapiro et al.	
	6,396,931	05/28/2002	Malilay	
	6,440,082	08/27/2002	Joo et al.	
	2002/058889	05/16/2002	Lee	

## FOREIGN PATENT DOCUMENTS

Examiner Initial	Document Number	Publication Date	Country	Translation	
				Yes	No
	90/08503	08/09/1990	PCT		

OTHER DOCUMENTS (Including Authors, Title of Item, Page(s), Vol/Issue No., Publisher, Place of Publication)					
	M. Akay et al., "Application of the ARMA Method to Acoustic Detection of Coronary Artery Disease," Medical & Biological Engineering & Computing, pp. 365-372, July 1991.				
	J.R. Bulgrin et al., "Comparison of Short-Time Fourier, Wavelet and Time-Domain Analyses of Intracardiac Sounds," Biomedical Sciences Instrumentation, Vol. 29, pp. 465-472, 1993.				
	J.Chambers, "The Clinical and Diagnostic Features of Mitral Valve Disease," Hospital Medicine, Vol. 62, No. 2, pp. 72-78, February 2001.				
	S.G. Chang et al., "Wavelet Thresholding for Multiple Noisy Image Copies," IEEE Transactions on Image Processing, Vol. 9, No. 9, pp. 1631-1635, September 2000.				
	V. Chervassky et al., "Myopotential Denoising of ECG Signals Using Wavelet Thresholding Methods," Neural Networks, Vol. 14, pp. 1129-1137, 2001.				
	M. Cozic et al., "Development of a Cardiac Acoustic Mapping System," Medical & Biological Engineering & Computing, pp. 431-437, July 1998.				
	C.G. DeGroff et al., "Artificial Neural Network-Based Method of Screening Heart Murmurs in Children," Circulation, pp. 2711-2716, June 5, 2001.				
	R.L. Donnerstein, "Continuous Spectral Analysis of Heart Murmurs for Evaluating Stenotic Cardiac Lesions," The American Journal of Cardiology, Vol. 64, pp. 625-630, September 15, 1989.				
	L.G. Durand et al., "Comparison of Spectral Techniques for Computer-Assisted Classification of Spectra of Heart Sounds in Patients with Porcine Bioprosthetic Valves," Medical & Biological Engineering & Computing, pp. 229-236, May 1993.				
	L.J. Hadjileontiadis et al., "A Wavelet-Based Reduction of Heart Sound Noise from Lung Sounds," International Journal of Medical Informatics, Vol. 52, pp. 183-190, 1998.				
	J.A. Horiszny, "Teaching Cardiac Auscultation Using Simulated Heart Sounds and Small-Group Discussion," Family Medicine, Vol. 33, No. 1, pp. 39-44, January 2001.				
	M. Schroeder, "Using Singular Value Decomposition to Visualise Relations Within Multi-Agent Systems," Proceedings of the Third International Conference on Autonomous Agents, Seattle, USA, ACM Press, pp. 313-318, 1999.				
	C. Ortiz-Neu et al., "Error Patterns of 3 <sup>rd</sup> Year Medical Students on the Cardiovascular Physical Examination," Teaching and Learning in Medicine, Vol. 13, No. 3, pp. 161-166, 2001.				

	M.R. Rangaraj et al., "Quantitative Analysis of the Phonocardiogram for Detection of Murmurs," Journal of Biomedical Engineering, Vol. 1, pp. 247-252, October 1979.
	L.G. Gamero et al., "Detection of the First and Second Heart Sound Using Probabilistic Models," Engineering in Medicine and Biology Society," Proceedings of the 25 <sup>th</sup> Annual International Conference of the IEEE, Vol. 3, pgs. 2877-2880, September 2003.
	L-G. Durand et al., "Digital Signal Processing of the Phonocardiogram: Review of the Most Recent Advancements," Critical Reviews in Biomedical Engineering, Vol. 23, Issue 3/4, pg. 163-219, 1995.
	F. Kovacs et al., "A Rule-Based Phonocardiographic Method for Long-Term Fetal Heart Rate Monitoring," IEEE Transactions on Biomedical Engineering, Vol. 47, No. 1, pp. 124-130, January 2000.
	P. Carson, "Problems in Auscultation," The Practitioner, Vol. 220, pp. 370-378, March 1978.
	A. Iwata et al., "Algorithm for Detecting the First and the Second Heart Sounds by Spectral Tracking," Medical & Biological Engineering and Computing, Vol. 18, pp. 19-26, January 1980.
	R. Rangayyan et al., "Phonocardiogram Signal Analysis: A Review," Critical Reviews in Biomedical Engineering, Vol. 15, Issue 3, pp. 211-236, 1998.
	M. Yokoi et al., "Clinical Evaluation on 5 Years' Experience of Automated Phonocardiographic Analysis," Japanese Heart Journal, 18, 482-490, 1977.
	C. Longhini et al., "The Fast Fourier Transform in the Analysis of the Normal Phonocardiogram," Japanese Heart Journal, Vol. 20, No. 3, pp. 333-339, May 1979.
	A.E. Cetin et al., "Classification of Closed-and Open-Shell Pistachio Nuts Using Voice Recognition Technology," ASAE Transactions, Vol. 47(2), pp. 659-664, 2004
	N. Ahmed et al., "Discrete Cosine Transform," IEEE Transactions on Computers 23(1), pp. 90-93.
	I. Cathers, "Neural Network Assisted Cardiac Auscultation," Artificial Intelligence in Medicine, pp. 53-66, 1995.
	A. Baskaran et al., "Fetal Heart Sound Analysis: A Preliminary Evaluation," Med. J. Malaysia, Vol. 51, No. 1, pp. 64-67, March 1996.
	M.R. Rangaraj et al., "Quantitative Analysis of the Phonocardiogram for Detection of Murmurs," Communications, Journal of Biomedical Engineering, Vol. 1, No. 4, October, 5 pages, 1979.

	M. Piepoli et al., "Contribution of the Dynamic Phonocardiography to the Valvular Heart Disease Diagnosis: An Expert System Study," Acta Cardiologica, International Journal of Cardiology, Vol. XLV, No. 6, pp. 521-527, 1990.
	J.S. Jeffrey et al., "Application of Phonocardiography for Detecting Hypoxia-Induced Cardiovascular Adaption in the Chicken," Avian Diseases, 43, pp. 359-366, 1999.
	M. Ishikawa et al., "Phonocardiographic Approach to the Detection of Right Ventricular Myocardial Infarction," Japanese Circulation Journal, Vol. 54, pp. 1233-1245, October 1990.
	L. Khadra et al., "The Wavelet Transform and its Applications to Phonocardiogram Signal Analysis," Medical Informatics, Vol. 16, No. 3, p. 271-277, 1991.
	International Preliminary Report on Patentability, from corresponding PCT Application Serial No. PCT/US2004/034557, mailed 01 March 2006, 10 pages.
<b>EXAMINER</b>	<b>Date Considered</b>
<p><b>*Examiner:</b> Initial if reference considered, whether or not citation is in conformance with MPEP 609; Draw line through citation if not in conformance and not considered. Include copy of this form with next communication to applicant.</p>	

Based on Form PTO-FB-A820  
(Also form PTO-1449)

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